



# Natural Compound Improves Apples' Red Coloring

Methyl jasmonate helps deepen the blush on the cheeks of Fuji apples.

**M**ethyl jasmonate (MJ) has many functions. This natural compound derived from plant oils—especially jasmine and honeysuckle oils—helps plants muster pest-defense proteins. Incorporated into cosmetic products, it produces a sweet, flowery aroma. Now, spraying MJ onto apples before harvest may improve uniformity and depth of red coloring in the fruit's peel, new research suggests.

“Applying MJ increases the total percentage of the crop having uniform red color, an important grading issue for domestic and export markets,” says ARS plant physiologist James Mattheis.

The approach draws on published research showing that when apples are exposed to natural or artificial light, MJ activates processes in the peel that produce anthocyanin pigments. MJ also breaks down the peel's green chlorophyll, though light isn't required.

“Application timing is important; treat too early in the season, and the color can fade by harvest,” says Mattheis, who heads ARS' Tree Fruit Research Laboratory in Wenatchee, Washington, a state forecast to produce 88.8 million boxes of fresh-market apples this year.

Though research is ongoing, ARS in May 2002 applied for patent protection (10/146,687) on the treatment, since no similar products are currently marketed, notes Mattheis, whose research team includes graduate student Dave Rudell and food technologist Xuotong Fan.

One particular use for MJ may be ensuring a more uniform red color on Fuji apples that have spent much of the growing season enclosed within opaque bags. In the United States and Japan, where Fujis originated, bagging is practiced to enhance the apple's red color close to harvest. Starting in late June, more than a month after a Fuji's flowers have bloomed, two overlapping bags are placed around the immature fruit by hand and kept in place until a few weeks before harvest (late September to early October in Washington). Even after the bags are removed, the red color continues to develop, albeit unevenly. Spraying MJ helps correct for this by promoting red color development on all sides of the apple, Mattheis notes.

MJ also works on such popular varieties as Red Delicious and Gala. “We didn't see any significant change in eating quality compared to untreated fruit,” says Mattheis of lab and orchard studies in which apples were treated with a water-based emulsion containing a surfactant and 2 percent or less MJ.

Other positives: MJ also works on harvested fruit for degreening, and is already classified by the Food and Drug Administration as a Generally Recognized As Safe substance. Despite its promise, MJ needs further evaluation. Too much can harm the fruit, and at about \$43 an ounce, the economics of orchard-scale treatments are uncertain.

“We're still not totally there in terms of minimizing the variability,” Mattheis says. “We're still trying to improve MJ formulation and timing and better understand the factors that influence success with this treatment.”

But if the approach bears fruit in terms of consistency and cost, apple growers could get a head-start on improving their crop's marketability.—By **Jan Suszkiw**, ARS.

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